The effects of spatial resolution and physiological contrast on fMRI patterns

Propositions of the PhD thesis

The effects of spatial resolution and physiological contrast on fMRI patterns

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1. The optimal spatial resolution of acquisition and preprocessing scheme for MVPA depends on the decoding task and brain area investigated.
2. Different features of complex (auditory) stimuli are spatially distributed in the brain and may be represented at different spatial scales.
3. Both baseline and stimulus-induced CBF is an alternative fMRI approach to the standard BOLD signal to study auditory processing and delineate the functional organization of the human auditory cortex.
4. Ultra-high field imaging significantly boosts BOLD signal CNR and has the potential to also improve CBF CNR.
5. Although all techniques should concur to describe the same functional specialization of cortical areas, the relationship and agreement between the resulting parcellations is still unclear.
6. Multi-modal neuroimaging and machine learning algorithms are two key factors for future developments in the cognitive neuroscience field.
7. Another challenge of the current neuroscientific research: moving from a group-averaging approach to an individual focus and personalized investigation.
8. A new contract has emerged in which the assumption that scientific knowledge is beneficial in its own right attracts lip service rather than funding, and in which there is little willingness to wait for the utility of knowledge to reveal itself over time. (Atkinson-Grosjean & Douglas, 2010; Stemerding & Nahuis, 2014)
9. What makes it difficult is that research is immersion in the unknown. We just don't know what we're doing. We can't be sure whether we're asking the right question or doing the right experiment until we get the answer or the result. (Schwartz, 2008)
10. Aerodynamically, the bumble bee shouldn't be able to fly, but the bumble bee doesn't know it, so it goes on flying anyway. (Mary Kay Ash)